



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/657,616	09/08/2003	Wen-Chin Lee	TSM03-0587	1051
43859	7590	11/01/2005		
SLATER & MATSIL, L.L.P. 17950 PRESTON ROAD, SUITE 1000 DALLAS, TX 75252			EXAMINER SCHILLINGER, LAURA M	
			ART UNIT 2813	PAPER NUMBER

DATE MAILED: 11/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/657,616

Applicant(s)

LEE ET AL.

Examiner

Laura M. Schillinger

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2005.
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 22-38 and 60-89 is/are pending in the application.
4a) Of the above claim(s) 60-89 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 22-38 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Newly submitted claims 60-89 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: claims 60-89 are independent and distinct species from that of originally elected claims

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 60-89 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 22-24, 26-27, 29, 31-38 are rejected under 35 U.S.C. 102(e) as being anticipated by Koester et la (US 2004/0164373 A1).

Art Unit: 2813

In reference to claim 22, Koester teaches a structure comprising:

A semiconductor substrate (page 2, {0018});

A first crystalline layer on the substrate (layer 10- note it is crystalline due to its disclosed tensile strain caused in layer 20- page 2 (0018));

A second crystalline layer on the first layer (layer 20- note it has a tensile strained state due to the lattice mismatch of underlying layer 10);

A trench formed in the second layer (trench- page 2 (0018)); and

A top epitaxial layer on the second layer (Fig.1 B (layer 20) and latter part of paragraph 0018)).

In reference to claim 23, Koester teaches wherein upper and lower corners of the trench are rounded (page 1 (0005)).

In reference to claim 24, Koester teaches wherein the upper corners of the trench are rounded (page 1 (0005)).

In reference to claim 26, Koester teaches wherein the trench has a depth of 6000 Å or less (page 3 (0021)).

In reference to claim 27, Koester teaches wherein the rounded corners are formed by heating the second layer in a gaseous ambient (0004-thermal oxidation).

In reference to claim 29, Koester teaches wherein the gaseous ambient includes O (0004-thermal oxidation).

In reference to claim 31, Koester teaches wherein the trench contains an insulative material comprising silicon oxide (layer 50- Page 2 (0018)).

In reference to claim 32, Koester teaches wherein the top layer is less than 250 Å thick (page 2 (0021)).

In reference to claim 33, Koester teaches wherein the first second and top layers comprise Si, Ge, C or a compound semiconductor (page 2 (0018)).

In reference to claim 34, Koester teaches wherein the first second and top layers comprise Si and Ge (page 2 (0018))

In reference to claim 35, Koester teaches wherein

A lattice of a material of the first layer mismatches with the lattice of the substrate;

A lattice of a material of the second layer mismatches with the lattice of the first layer (page 2 (0018)-tensile strain).

Art Unit: 2813

In reference to claim 36, Koester teaches wherein the lattice of a material of the top layer is mismatches with the lattice of the second layer (page 2 (0018)).

In reference to claim 37, Koester teaches wherein a free surface of one or more layers is planarized before a next superjacent layer is present thereon (page 3 (0025- polishing)).

In reference to claim 38, Koester teaches wherein planarization is effected by CMP (page 3 (0025)).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 25 and 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koester et al (2004/0164373) as applied to claim 22 above, and further in view of Chang et al ('224).

In reference to claim 25, Koester teaches the limitations of claims 22-24 however fails to explicitly teach wherein the radii of the corners are from 5 to 50 nm nor does Koester specify wherein heating is effected at a temperature within the range of 700 to 950 degrees C..

Art Unit: 2813

However, Chang et al ('224) teaches a similar structure wherein the radii of the corners are from 5 to 50 nm (Col.5, lines: 25-30) and further teaches wherein heating is effected at a temperature within the range of 700 to 950 degrees C (Col.5, lines:20-25).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Koester to further include a thermal oxidation temperature of 700-950 degrees and a radii as taught by Chang because both teach to implement thermal oxidation to produce curved trench corners and would produce a similar curved radius.

Claims 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koester et al (2004/0164373), and Chang et al ('224) further in view of Jang et al ('566).

In reference to claim 30, Chang and Koester teach a thermal oxidation to produce rounded corners in a trench, however fail to explicitly teach heating (thermally oxidizing) with a pressure between 10 and 1000 Torr.

Jang however teaches thermal oxidation at a pressure between 10 and 1000 Torr (Col.8, lines: 55-60).

Therefore it would have been obvious to one of ordinary skill in the art to employ a thermal oxidation method including a pressure as taught by Jang since as Jang teaches such pressure is effective in forming an oxide layer (Col.8, lines: 50-61).

Response to Arguments

Applicant's arguments filed 8/17/05 have been fully considered but they are not persuasive. Applicant argues that Koester fails to teach a crystalline nor an epitaxial layer. However, as pointed out in the Examiner's non-final rejection, in order for a tensile strain to be formed there must be a lattice mismatch- such lattice structures may only be mismatched if such layers are crystalline. Applicant argues further that Koester fails to teach a third epitaxial layer formed over two crystalline layers. However this also is unpersuasive because in paragraph 0018, Koester explicitly teaches that the layer is formed by epitaxy.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

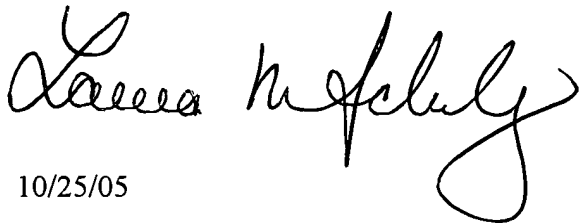
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Art Unit: 2813

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M. Schillinger whose telephone number is (571) 272-1697. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Laura M Schillinger
Primary Examiner
Art Unit 2813

10/25/05